CLAIMS

What is claimed is:

1. A method for simultaneously compensating a source drift of a light source and a detector drift of a light detector, said method comprising:

a) providing a first beam path for a probe beam traveling from said light source to a test location;

b) providing a second beam path from said test location to said light detector such that said second beam path crosses said first beam path at a beam crossing;

c) positioning at said test location a calibration sample for sending a known response beam along said second beam path to said light detector in response to said probe beam;

d) calibrating said light source and said light detector using said known response beam;

e) placing a reference sample at said beam crossing for sending a reference beam along said second beam path to said light detector in response to said probe beam;

f) simultaneously compensating said source drift and said detector drift using said reference beam.

2 .The method of claim 1, wherein said step of simultaneously compensating comprises establishing a relation between said known response beam and said reference beam.

3 The method of claim 1, further comprising placing a test sample at said test location such that said test sample sends a response beam along said second beam path to said light detector in response to said probe beam.

4. The method of claim 3, wherein said step of placing said reference sample at said beam crossing and said step of simultaneously compensating are performed while said test sample is at said test location.

5. The method of claim 1, wherein said calibration sample is a reflective calibration sample having a well-known reflectivity.

6. The method of claim 1, wherein said reference sample is selected such that the intensity of said reference beam is within a predetermined range of the intensity of said response beam.

7. The method of claim 1, further comprising the step of collimating said probe beam and said response beam at said beam crossing.

8. A system for simultaneously compensating a source drift of a light source and a detector drift of a light detector, said system comprising:

a) a test location;

b) a first beam path from said light source to said test location;

c) a second beam path from said test location to said light detector;

d) a beam crossing between said first beam path and said second beam path;

e) a calibration sample for positioning at said test location and for sending a known response beam along said second beam path to said light detector in response to said probe beam;

f) a first control unit for calibrating said light source and said light detector using said known response beam;

g) a reference sample for placing at said beam crossing for sending a reference beam along said second beam path to said light detector in response to said probe beam; and

h) a second control unit for simultaneously compensating said source drift and said detector drift using said reference beam.

9. The system of claim 8, further comprising a test sample for positioning at said test location for sending a response beam along said second beam path to said light detector in response to said probe beam.

10. The system of claim 9, wherein said reference sample is selected such that the intensity of said reference beam is within a predetermined range of the intensity of said response beam.

11. The system of claim 8, wherein said calibration sample is a silicon sample.

12. The system of claim 8, wherein said light source is selected from the group of light sources consisting of incandescent bulbs, lasers, and gas discharge tubes.

13. The system of claim 8, wherein said light source is a broadband light source.

14. The system of claim 8, wherein said light detector is selected from the group of light detectors consisting of broadband light detectors and photospectrometers.

15. The system of claim 8, wherein said calibration sample is reflective calibration sample having a

well-known reflectivity.

16. The system of claim 8, further comprising a first toroidal mirror positioned in said first beam path.

17. The system of claim 16, further comprising a second toroidal mirror, said first toroidal mirror being positioned to collimate said probe beam to produce a collimated probe beam, said second toroidal mirror being positioned to focus said collimated probe beam.

18. The system of claim 8, further comprising a third toroidal mirror positioned in said second beam path.

19. The system of claim 18, further comprising a fourth toroidal mirror, said third toroidal mirror being positioned to collimate said response beam to produce a collimated response beam, said fourth toroidal mirror being positioned to focus said collimated response beam.

20. The system of claim 19, further comprising a first toroidal mirror positioned to collimate said probe beam to produce a collimated probe beam, and a second toroidal mirror being positioned to focus said collimated probe beam, said collimated probe beam crossing said collimated response beam at said beam crossing.

21. The system of claim 20, wherein a first optical length from said first

toroidal mirror to said second toroidal mirror equals a second optical length from said first toroidal mirror to said fourth toroidal mirror passing through said beam crossing.

22. The system of claim 8, further comprising at least one lensing element positioned in said first beam path.

23. The system of claim 8, further comprising at least one lensing element positioned in said second beam path.

24. The system of claim 8, further comprising at least one optical fiber in said first beam path.

25. The system of claim 8, further comprising at least one optical fiber in said second beam path.